

Energy Efficiency

Fact Sheet

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Industrial Energy Efficiency

Using new technologies to reduce energy use in industry and manufacturing

Key Facts

Industry uses over 1/3 of the energy consumed in the United States.

Oil and natural gas provide nearly four-fifths of industrial energy; the remainder is derived in the most part from electricity and coal.

Between 1990 and 2003, US industrial output grew 25 %, but industrial energy use increased only by 2 %.

Efficient Industrial Technologies

In 2003, technologies developed with the EESI program's assistance reportedly saved the market more than 121 trillion Btus, about \$740 million (based on 2004 industrial energy costs), according to ITP.

The Dallas-Fort Worth International Airport decreased energy usage at its central plant by 28 % from 2001 to 2005, resulting in a total prevented energy use of 25 million MMBtus, or \$150m at today's energy rates.

Companies may be able stay clear of these in-advance costs by contracting with an energy service practice that purchases and sets up brand-new equipment, and then is paid from the energy cost savings, under an arrangement known as an energy service efficiency contract (ESPC).

Combined Heat and Power

Conventional electrical power generation transforms about a 3rd of the fuel's possible energy into functional energy, while combined heat and power, likewise called cogeneration, converts as much as 90 % of the fuel into usable energy.

Demonstration tasks conducted by the Department of Energy utilizing new innovations and materials, how industries can apply the present techniques more efficiently. They also enable the smelting process to occur at lower temperature levels, achieving energy cost savings of 20 to 30 % over technologies in use today.

Bio-Energy (Anaerobic Digestion for Biogas)

This technology permits companies to create power on-site, so they do not need to acquire as much electricity from the utilities.

Motors

Engines generally work on a continuous circulation of energy, which is often higher than needed for regular operations. An adjustable speed drive can differ the motor's energy output to match the load, achieving energy savings ranging from 3 to 5 % as much as 60 %, depending on how the motor is made use of. Using superconducting products in motor coils can likewise greatly reduce energy losses.

Steam Systems

Over 45 % of the fuel utilized by US manufacturers is combusted to make steam. According to the United States Department of Energy (DOE), the typical industrial facility can reportedly decrease their energy usage 20 % by insulating steam and condensed steam pipes, plus stopping steam loss by leakage, and better attention to maintaining steam traps.

Compressed Air Systems

Many markets make use of compressed air for sand blasting, painting, or other devices. Optimizing compressed air systems by setting up new equipment with variable speed drives, in addition to preventive upkeep to fix and spot air leaks, can enhance energy effectiveness 20 to 50 %, according to the United States Department of Energy.

Continuous Fiber Ceramic Composites

These composites are light, strong, and corrosion resistant. They heat rapidly and can be made use of in heat-exchange systems, where they are able to run effectively at higher temperatures than metal components. They can also be utilized as liners around turbines to seal in heat and gases, preventing leakages and enduring high temperatures for long periods of time, therefore decreasing the turbines' maintenance downtime and enhancing its efficiency.

Combustion in Boilers and Heaters

New developments in advanced boilers and heaters can operate at higher temperature levels while burning less fuel. These innovations produce less contaminants in addition to being more efficient.

Energy-Intensive Industries

Aluminium Smelters

Smelting aluminium is highly energy-intensive, as it involves passing electrical current through molten aluminium. Presentation projects conducted by the Department of Energy utilizing brand-new technologies and materials use the existing more effectively and enable the smelting process to take place at lower temperature levels, achieving energy savings of 20 to 30 % over technologies in use today.

Chemical Industry

The chemical market is developing new drivers to reduce the energy requirements for different chemical reactions. In 2003, technologies established with the EESI program's assistance conserved industry more than 121 trillion Btus, about \$740 million (based on 2004 industrial energy costs), according to ITP.

Numerous chemicals, consisting of petroleum, need to be separated into their parts. Researchers are developing membranes which can separate different chemicals making use of less energy than distillation or centrifuges.

Forest Items

The forest products market is the third biggest industrial customer of energy. In consolidated heat and power plants, it uses its wood waste to generate more than half the energy it makes use of. Drying paper is the most energy-intensive step in paper production, and a brand-new procedure

called impulse drying out can minimize the energy required to dry paper by approximately 50 %. The paper market is also developing new whitening agents to use less energy while developing less poisonous by-products.

Glass Making

New and recycled glass must be melted so that it can be formed into the desired products. DOE presentation suggested that projects with brand-new, heat-resistant products and heating systems are available that use pure oxygen as opposed to air use 5 to 7.5 % less energy than older heaters.

Steel and Other Metals

Producing a lots of steel in 2005 requires 25 to 50 % less energy than in 1970, according to a study by the International Iron and Steel Institute (IISI). Research into energy performance is continuing, and improved metal casting innovations reduce the have to rework parts, lower the variety of defects in the metal, and can permit metals to be cast in a continuous process, which is more energy reliable than standard multi-step casting processes.

Benefits and Costs of Introducing Improved Industrial Energy Efficiency

Over the previous 25 years, the DOE's Industrial Technologies Program (ITP) has actually supported more than 600 demonstration, study, and development jobs that have actually produced over 160 brand-new innovations. In 2003, innovations established with this program's support saved market more than 121 trillion Btus, about \$740 million (based on 2004 industrial energy prices), according to ITP.

At its 300,000-square-foot bakeshop in Sacramento, California, Sara Lee changed a 150-horsepower air compressor with a 100-horsepower system fitted with a variable-speed drive, fixed leakages, and made other repair works. It now utilizes about 470,000 kilowatt-hours less electricity each year and downloads \$40,000 annually in running costs (at 2005 energy rates). These brand-new devices reportedly need less maintenance with an additional \$10,000 annually of savings. After an \$11,000 rebate from the Sacramento Municipal Utility District, the total project cost the Sara Lee Corporation only \$27,000, yielding a basic payback time of only 6.5 months.

Potential Funding Barriers

Companies setting up energy-efficient devices can incur significant capital costs. Companies can avoid these in advance costs by contracting with an energy service company that purchases and sets up the brand-new equipment, and then is paid from the energy cost savings, under an agreement known as an energy service efficiency agreement (ESPC).

For More Information contact the American Council for an Energy Efficient Economy:

<http://aceee.org/industry/index.htm>

Consortium for Energy Efficiency, Inc. <http://www.cee1.org/content/cee-program-resources>

Industrial Efficiency Alliance <http://www.industrialefficiencyalliance.org>

US Combined Heat and Power Association <http://uschpa.admgt.com>

DOE Office of Energy Efficiency and Renewable Energy

<http://www.eere.energy.gov/EE/industry.html>

An original 2006 Version is at: http://www.eesi.org/files/industry_efficiency_0506.pdf

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